

CLAIMS

I CLAIM:

- 5 1. An intermittent pressure module for controlling the position of a valve between two positions comprising:
 - (a) diaphragm means;
 - 10 (b) a plurality of ports associated with said diaphragm means for exposing said diaphragm means to a selected pressure in said first position, and another pressure in said second position;
 - (c) swing means associated with said diaphragm means and said valve
15 means for intermittently displacing said valve means when said diaphragm means is exposed to said selected pressure in said first position and said other pressure in said second position.
2. An intermittent pressure module as claimed in claim 1 wherein said
20 selected pressure comprises a vacuum , and said other pressure is ambient.
3. An intermittent pressure module as claimed in claim 2 wherein said diaphragm means comprises a diaphragm assembly displaceable between two positions in a diaphragm chamber.

4. An intermittent pressure module is claimed in claim 3 wherein said plurality of ports comprising:

5 (a) a port venting to ambient pressure;

(b) a vacuum port;

(c) a diaphragm port.

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5. An intermittent pressure module as claimed in claim 4 wherein said valve means couples said vacuum port with said diaphragm port for communicating vacuum pressure with said diaphragm chamber so as to draw said diaphragm assembly to said first position.

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6. An intermittent pressure module as claimed in claim 5 wherein said valve means couples said vacuum port with said port venting to ambient pressure to evacuate said vacuum from said diaphragm chamber and move said diaphragm to said second position.

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7. An intermittent pressure module as claimed in claim 6 wherein said diaphragm assembly is connected to a spring loaded swing arm for moving said valve between said first and second positions.

25 8. An intermittent pressure module as claimed in claim 7 wherein said intermittent pressure module is connected to a vacuum regulated for delivering intermittent vacuum.

9. A vacuum regulator having:

- (a) an intermittent channel for vacuum flow;
- (b) a regulator channel for regulating a level of vacuum;
- (c) an intermittent vacuum module removably securable to said vacuum regulator, said intermittent vacuum module presenting
 - (i) an intermittent port for communicating with said intermittent vacuum channel;
 - (ii) a regulator port for communicating with said regulator channel;
 - (iii) a diaphragm assembly displaceable within a diaphragm chamber having a diaphragm port;
 - (iv) valve means for intermittently connecting
 - (1) said intermittent port with said diaphragm port so as to expose the diaphragm assembly to a vacuum in a first position;
 - (2) said intermittent port to said regulator port to relieve said vacuum from said diaphragm assembly to ambient pressure and said second position
 - (v) swing means associated with said diaphragm assembly and said valve means for intermittently displacing said valve means when said diaphragm means is exposed to said

vacuum in said first position and ambient pressure in said second position.

10. A vacuum regulator as claimed in claim 9 wherein said vacuum regulator
5 further includes

(a) a vacuum channel;

(b) a full vacuum output channel;

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(c) a selector having:

(i) an intermittent selector port

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(ii) full vacuum selector port

(iii) a vacuum inlet selector port

(iv) regulator selector port

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(d) a gasket for blocking said full vacuum selector port;

(e) a valve coupler presented by said valve means for:

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(i) coupling said valve inlet selector port to said regulator selector port for regulating said vacuum level;

(ii) coupling said vacuum inlet selector port to said intermittent selector port for intermittent vacuum;

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(iii) turning off said vacuum.

11. A vacuum regulator as claimed in claim 10 wherein said intermittent module is removable and said gasket is replaceable for disabling intermittent vacuum and permitting full vacuum delivery.

5 12 A vacuum regulator as claimed in claim 11 wherein said intermittent module includes an adjustable needle valve for controlling the rate of flow of air into and out of said diaphragm chamber.

13. A vacuum regulator as claimed in claim 12 wherein said diaphragm
10 assembly including:

(a) a rolling diaphragm;

(b) spring means disposed between said diaphragm and said
15 diaphragm chamber;

14. A vacuum regulator as claimed in claim 13 wherein said swing means comprises a spring loaded swing arm connected at one end to said rolling diaphragm and at another end to said valve means.

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15. A vacuum regulator as claimed in claim 14 wherein said valve means includes a pivot point at one end and a plurality of cups at another end.

16. A method of producing an intermittent vacuum by moving a valve to a first
25 position to couple a supply of vacuum to a diaphragm chamber having a diaphragm move in response to said vacuum for moving a spring loaded spring arm so as to move said valve to a second position to couple said supply of vacuum to a regulated port so as to relief said vacuum from said diaphragm chamber and move said diaphragm in response to said relief for moving said
30 spring loaded spring arm and move said valve to said first position, repeatedly.

17. A method as claimed in claim 16 wherein said intermittent vacuum is delivered in a ratio of 2:1.

18. A method as claimed in claim 17 wherein said spring-loaded spring arm is
5 stable in said first and second positions.

19. A method as claimed in claim 18 wherein said time duration of said intermittent vacuum flow is controllable by an adjustable needle control valve.

10 20. A method as claimed in claim 19 wherein said intermittent vacuum is delivered to a vacuum regulator.